Richness, complexity & condition of remnants in the eastern Darling Downs, Queensland

Andy Le Brocque, Charlie Zammit & Kate Reardon-Smith
Land Use Research Centre, University of Southern Queensland, Toowoomba, Qld email: landuse@usq.edu.au

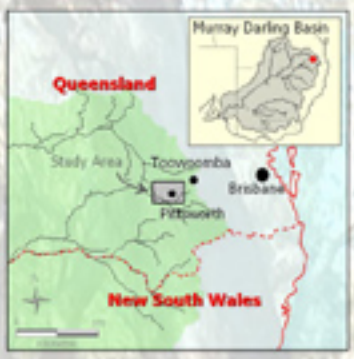
www.usq.edu.au/lurc

Introduction

Vegetation remnants in the eastern Darling Downs are highly fragmented and greatly reduced in size. Since 1975 there has been up to a 60% reduction in native vegetation in the region. Little is known about habitat quality and condition of remnant and re-growth vegetation, including endangered ecosystems such as bluegrass grasslands & semi-evergreen vine thickets.

The objective of this research was to compare plant species richness, condition and habitat complexity in remnant vegetation in the study area.

Figure 1: Map of north eastern Murray-Darling Basin showing location of study area



Methods

- 43 sites were sampled across 11 vegetation types in the study area in southern Queensland (Fig. 1).
- Plant **species richness** was determined in a single 500 m² quadrat at each site.
- **Habitat complexity**[1] was derived from vegetation structure (FPC of strata, cover of litter, logs etc) and other biophysical attributes (e.g. hollows, stags etc).
- A measure of **vegetation condition** was derived from the summation of scores for range of attributes (Table 1).
- One-way anova compared attributes across vegetation types; Spearman Rank correlations examined relationships between attributes.

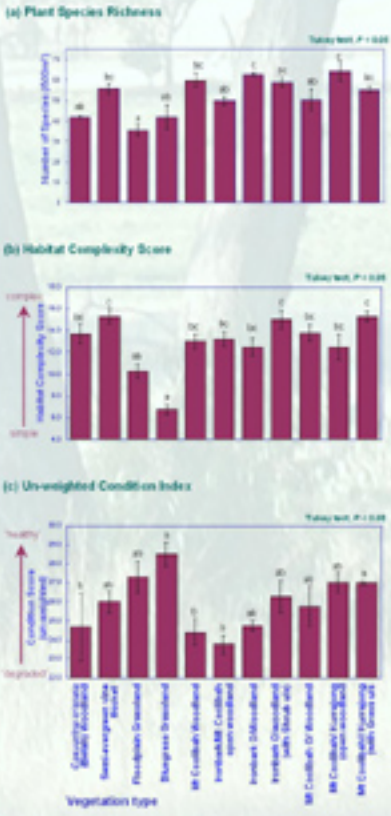
Table 1: Components of Condition Index

Component	Method
Physical disturbance: Grazing; Clearing; Erosion; Weeds; Ferals; Logging; Epicormic Growth; Compaction; Canopy Death	Attributes ranked in field (0-3: 0=low, 3=high dist) – inverse rank used to determine score (ie 0=degraded, 3=healthy)
Recruitment: Juvenile Density [trees] (3 classes: <1, 1-3, >3m ht)	Ranked 0=0; 1=1-10; 2=10-20; 3=>20 individuals /500m²
Ground cover: Litter Cover & Bare ground Cover	Litter 0=0%; 1=1-10%; 2=10-30%; 3=>30% cover Bare ground 0=>20%; 1=10-20%; 2=<10%; 3=0%

Results & Discussion

- richness =31-83 spp./500m²; habitat complexity = 6-17; condition = 23-31.
- significant patterns in species richness, complexity and condition across vegetation types (Fig. 2).
- grasslands - low complexity, fewer species, high condition.
- Mt Coolibah & Ironbark/Mt Coolibah woodlands - low condition, intermediate richness and complexity.
- richness-complexity strongly correlated (R_s= 0.54 P<0.001); richness-condition poorly related (R_s= -0. 20 P>0.05).

Figure 2: Comparison of Species Richness, Habitat Complexity and Condition across vegetation types



While species richness alone is not a definitive attribute of vegetation, current theory would suggest that richness would be related to condition.

Developments in assessing soil condition[2] and habitat quality[3] may prove to work well where there are suitable reference sites; however, broader application of condition indices, particularly in regions that are highly modified, may require considerable internal calibration.

Conclusions

There is a need for simple, robust and meaningful on-ground indicators of the impacts of human activities in remnants.

Methods for habitat complexity have been developed for some time and have been rigorously tested over a range of ecosystems.

However, the notion of habitat condition remains rather vague and largely untested. This is despite a growing acceptance of this attribute as a decision tool by land managers.

Clearly, further development of methods for the accurate quantification of condition is necessary.

Acknowledgements

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